Rationalist Press Association, Ltd., in paper covers at sixpence, by Messrs. Watts and Co.

A NEW medical and scientific circulating library has been opened by Mr. T. H. Prince, who was for many years with Mr. H. K. Lewis, and has just started as a medical and scientific bookseller at Praed Street, Paddington. It is promised that all standard works in the various branches of science will be available to subscribers.

WE have received the concluding part of the *Boletim Mensal* of the Observatory of Rio de Janeiro for the year 1901. In addition to the meteorological observations taken eight times daily at that observatory, the *Bulletin* contains monthly and yearly results for various parts of Brazil, and a valuable summary for twenty years (ending March, 1901) for Bahia, from observations made by Dr. Guimarães.

SEVERAL new forms of apparatus for the physical laboratory have lately been produced by Messrs. W. G. Pye and Co., Cambridge. Among the instruments are a table cathetometer and a reading microscope, constructed on the geometric slide principle, an improved pattern storage cell, five hundred of which have been in use at the Cavendish Laboratory for several months and have proved "very convenient and thoroughly satisfactory," and sets of patent resistance coils, in which the coils themselves take the place of the usual plugs and can be easily removed to show the wire and method of construction.

A NOTEWORTHY paper on the decomposition of urea is contributed by Mr. C. E. Fawsitt to the fifth number of the *Zeitschrift für physikalische Chemie*, vol. xli. When a pure aqueous solution of urea is heated at 100° C. for a considerable time, the urea is completely transformed into ammonium carbonate. This decomposition takes place also under the influence or acids and bases, the velocity under these circumstances being much greater. If strongly alkaline solutions are excepted, the decomposition takes place in all cases according to the simple equation for a unimolecular reaction, a result which does not accord with the ordinary method of representing the reaction. The author finds that the facts can only be satisfactorily explained by assuming that the urea is in the first place transformed into ammonium cyanate and that a state of equilibrium is set up between these two substances. The cyanate, however, is gradually decomposed with the formation of ammonium carbonate, the equilibrium being thus disturbed, and a further quantity of urea undergoes transformation into the cyanate. This decomposition of ammonium cyanate into ammonium carbonate takes place very quickly under the influence of acids. A large amount of experimental evidence is found to support the theory advanced, and the author concludes that urea is not directly attacked either by water, acids or moderately concentrated alkalis. Concentrated solutions of the alkalis have probably however a direct saponifying action upon the urea, in addition to the indirect action described.

AN investigation of the rate of bromination of carbon compounds by L. Bruner, which will be of considerable interest to organic chemists, is published in the current number of the *Zeitschrift für physikalische Chemie*. The catalytic action of iodine on the bromination of benzene has been carefully studied in a quantitative manner, and it is shown that this action is very probably due to the formation of iodine monobromide, which by its dissociation gives rise to free bromine atoms. These free bromine atoms are the active agents in the bromination process, and the catalytic influence of the iodine is due to the much greater dissociation of the iodine bromide as compared with that of bromine itself. The author shows that the substitution of bromine is a quadrimolecular reaction taking place according to the equation

$$C_6H_6 + 4Br = C_6H_5Br + HBr_3 \rightleftharpoons Br_2.$$

The action of other carriers has also been investigated, the most active in the case of the bromination of benzene and bromobenzene being aluminium bromide. This compound has, however, no influence on the bromination of nitrobenzene. From the concentrated nitrobenzene solution, a compound of the formula $AlBr_3.2C_6H_5NO_2$ has been crystallised out, a fact of some interest in view of Gustavson's theory of the mode of action of $AlBr_3$ in the bromination of benzene, toluene and other compounds. The author has finally investigated the relative velocities of some so-called instantaneous reactions. It is found that the bromination of aniline takes place more rapidly than that of phenol, and that the velocity of the latter reaction is about one-fifth of that at which iodine is separated by bromine from potassium iodide solution.

THE additions to the Zoological Society's Gardens during the past week include a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mrs. Chas. Lisle Hacket; two Mozambique Monkeys (*Cercopithecus pygerythrus*) from East Africa, presented respectively by Mr. J. M. Creasey and Mrs. G. Ord; a Common Marmoset (*Hapale jacchus*) from South-east Brazil, presented by Mrs. Murray Simpson; a Gannet (*Sula bassana*) from Scotland, presented by Lord Ribblesdale; six Carolina Anolis (*Anolis carolinensis*) from Florida, two Tarantula Spiders, from Arizona, presented by Miss Ilda Orme; two Entellus Monkeys (*Semnopithecus entellus*), two Sambur Deer (*Cervus aristotelis*), two Nylghaies (*Boselaphus tragocamelus*), two Tigers (*Felis tigris*), two Gadwells (*Chaulelasmus streperus*), an Indian Adjutant (*Leptoptilus argala*) from India, two Nutmeg Fruit Pigeons (*Myristicivora bicolor*) from Moluccas, received in exchange; eight Saddle-backed Tortoises (*Testudo ephippium*), two Thin-shelled Tortoises (*Testudo microphys*), twenty-four South Albemarle Tortoises (*Testudo vicina*), one —— Tortoise (*Testudo* ——), seven —— Iguanas (*Conolophus subcristatus*) from the Galapagos, four Indian Porphyrios (*Porphyrio calvus*) from Eastern Asia, a Brindled Gnu (*Connochaetes taurina*) from South Africa, deposited.

OUR ASTRONOMICAL COLUMN.

A NEW TRANSITING DEVICE.—An article by Mr. M. B. Snyder, of the Philadelphia Observatory, in *Popular Astronomy*, No. 97, discusses a new device for transiting stars, in which the micrometer thread is moved, with a regular speed, across the field by means of an electric motor.

The fundamental idea of getting rid of the personal equation in transit observations by using mechanical transiters was first suggested by Braun in 1865 and since then has been persistently developed by Repsold. After discussing the various methods suggested by these and other inventors, Mr. Snyder gives some details of his own device, although full details are withheld for a future communication when circumstances have permitted of more time being spent on the subject.

In Mr. Snyder's instrument, the micrometer screw, and thereby the micrometer thread, is driven across the field of the instrument by an electric motor, at a speed depending on the declination of the object observed, whilst at the same time the observer, by using a secondary adjustment, keeps the star image accurately bisected, and the various positions of the thread are automatically recorded, by means of an ordinary chronograph, at the end of each revolution of the screw. Then at the moment of meridian passage an automatic electrical arrangement records the instant of transit. The micrometer in its fundamentals is of the ordinary type, and is at present attached to the 4-inch meridian circle of the Philadelphia Observatory; it is so arranged that, with the motor driving regularly, visual observations may be made, and recorded by any one of the usual methods, synchronously, thus forming a ready means of determining the personal equations existing between the various individuals of any group of observers.

THE SEARCH FOR A PLANET BEYOND NEPTUNE.—Herr T. Grigull, of Münster, Germany, describes in the October number of the *Bulletin de la Société Astronomique de France* his new contribution to the research which has for its object the discovery of another planet, beyond the orbit of Neptune.

In a previous paper (*Bulletin*, January, 1902, p. 31), Herr Grigull explained the hypothesis on which his calculations are based, and the elements of the hypothetical planet as deduced from the observations of the aphelia of three comets. In the present contribution, the elements given below have been calculated from the observed aphelia of twenty comets which appeared, and were observed and recorded, between the years 1490 and 1898. After giving due weight to the various cometary observations, the author has calculated these elements for the possibly existing planet :—

Epoch 1902.

$\lambda = 357^\circ 54 \pm 1^\circ 867$
Dist. from sun = 50·61 R.
Time of revolution = 360 years.
$\Omega = 90^\circ$ (???).
$\omega = ?$.

A NEW MINOR PLANET.—In No. 3819 of the *Astronomische Nachrichten*, Prof. Max Wolf announces, along with other minor planetary observations, the discovery of another new minor planet, 1902 T.

COMET 1902 *b*.—A number of observations of this comet have been made.

A photograph taken on September 27 by Prof. Kononowitsch, Odessa, with three hours' exposure, shows a straight double tail extending in a southerly direction to a distance of 3°.

Prof. Nijland has published, in the *Astronomische Nachrichten* (No. 3817), a further ephemeris, from which the following extract is taken :—

1902.	app. α. h. m. s.	app. δ. ° ′	Brightness.
Oct. 16 ...	18 16 24 ...	+16 30·5	
17 ...	9 55 ...	14 9·1	
18 ...	4 7 ...	11 58·9	... 13·0
19 ...	17 58 52 ...	9 59·1	
20 ...	54 6 ...	8 8·9	
21 ...	49 43 ...	6 27·3	
22 ...	45 41 ...	4 53·6	... 10·9
23 ...	17 41 56 ...	+3 26·9	

The brightness of the comet on September 16 is taken as unity, and it was then estimated at 7·5m.

THE BRITISH ASSOCIATION AT BELFAST.

SECTION A.

SUBSECTION OF ASTRONOMY AND COSMICAL PHYSICS.

OPENING ADDRESS BY ARTHUR SCHUSTER, F.R.S., F.R.A.S., CHAIRMAN OF SUBSECTION.

OUR proceedings to-day constitute an innovation and require a few words of explanation. When, a few years ago, some astronomers felt that our Association bestowed an insufficient share of attention on their subject, an easy remedy suggested itself in the formation of a special subsection devoted to that subject. Such a subsection was accordingly organised at Bradford and Glasgow, but for reasons, which are perhaps not altogether to be regretted, the experiment was only partially successful. In the meantime the work of Section A became heavier and heavier, and, as it seemed necessary to find some way of relieving its meetings, it was decided to hand over to the already established subsection of Astronomy other subjects, such as Meteorology, Terrestrial Magnetism, Seismology, and, in fact, anything that the majority of physicists is only too glad to ignore.

When the Council of the British Association asked me to act as President of such an enlarged subsection, I was very doubtful whether I ought to accept the honour. In the first place, I felt incompetent, owing to my almost complete ignorance of most branches of astronomy, and in the second place I do not approve of the formation of subsections dealing with important branches of Physics. If I eventually consented, it was partly because I lacked the strength of mind to refuse an honour of this kind, but partly because I was glad to have an opportunity of raising the whole question of the organisation of our meetings. The ground for such a discussion has, however, to a great extent disappeared, because, when the Organising Committee of Section A met in the spring, there appeared amongst those present a sudden revival of interest in the subjects assigned to the subsection and it was decided that the main section should not meet at all to-day so as to allow its members to help us in our discussions. The parent section has, therefore, voluntarily submitted itself to absorption by its neglected offspring, which now has to show that Cosmical Physics obeys the laws of Terrestrial Physics and that good absorbers are also good radiators.

Gratifying as this reunion must be to us, it fails to realise one of the original objects for which we have been called into existence, because instead of lightening your work it has added to it by imposing upon you the burden of having to listen to a second Presidential Address. I will try to make this additional burden as light as possible by concentrating my general remarks into a few sentences and then introducing the business of the section by means of a contribution to its scientific work, which I otherwise should have made in the ordinary course of the meeting.

To make our meeting as fruitful as possible, we should make the fullest use of the opportunities it gives us of personal contact and interchange of ideas. This is not accomplished by dividing into separate camps as soon as we have come together, but rather by finding some common ground for our debates. We should not try to minister to the separate needs of the specialist in electricity, or in meteorology or in astronomy, but should impress upon each of these specialists that they must bring before us the results of their investigations in so far as they bear on the more general questions in which we all are, or ought to be, interested. If it is necessary to lighten the work of the section this should be done by excluding all papers which are of interest only to specialists, or by establishing subsections for such papers. Let us divide—if divide we must—according to the character of the contribution, rather than according to the subject it happens to deal with. The difficult and, perhaps, unpopular censorship which such a course would involve would probably be temporary only, as the character of the papers which are desired for the main section would soon become known, and the increased attraction and usefulness of our discussions would, I am convinced, in a few years compensate for the initial trouble. We all require, occasionally, to be reminded that the detail work which is necessary, and on which most of us are engaged, is only of importance or interest if it helps us forward towards the solution of the great problems of Nature.

Addressing myself more particularly to Astronomers, I should like to say that we shall always welcome them as members of Section A, and that the benefit we shall derive from their contributions will be great in proportion as they will consider themselves to be citizens of the general empire of that section rather than inhabitants of an independently governed State.

There is one minor reform, or perhaps I ought to call it a protest against one of the traditions of the Association, which I feel called upon to urge on you. Discussion is our principal aim, and we are always trying to find suitable subjects for discussion ; yet we are prevented by the rules of the Association from discussing the Presidential address and the reports of Committees. Those who framed such a rule must have had some unfortunate idea that the dignity of the chair might be endangered if some criticism happened to be expressed in the discussion of the Chairman's address, or that the value of the report of a Committee might be endangered by some adverse comment coming from outside. But it seems to me that a scientific society or association, and especially one framed on a democratic constitution, ought not to take such a narrow and unscientific view. I can remember several Presidential addresses which might, and probably would, have given rise to most instructive debates had the rule not existed. Reports of Committees if not suitable for discussion should not be read at all ; but if read they should be open to discussion.

I hope that to-day you will not feel yourself bound by ancient custom, but in order that, at any rate, the more scientific portion of my contribution to our proceedings should not be stained by the suspicion of immaculate conception, I will now ask the duly-constituted President of our section to take his proper place.

The question I wish to bring to your notice to-day is an old one : if two events happen simultaneously or one follows the